

## Large-Eddy Simulation of the Transitional Flow in Natural Convection in a Horizontal Annulus

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Three-dimensional analysis of the transitional flow in natural convection in horizontal cylindrical annulus was performed, using Large-Eddy Simulation methodology with dynamical sub-grid scale model. The finite volume method is applied in cylindrical coordinates with an staggered grid. The second order Adams-Bashforth temporal scheme and the second order central-difference spatial scheme were used. The governing equations were solved with a fractional time-step method, employing the following boundary conditions: non-slipping and impermeability in the radial direction and periodicity in the tangential and axial directions. The time-step is conditioned by the CFL criterion. The beginning of the transition process and the beginning of turbulent regimes is indicated. The characteristics of the oscillatory and the influence on heat transfer coefficient were analyzed. The results showed that coherent structures exist in this type of flow.

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